

Public Health

Seattle & King County Fact Sheet

Smallpox: Information for Health Care Providers

☐ Epidemiology

- ✓ Smallpox was declared eradicated from the world in 1980.
- ✓ Two smallpox virus strains exist: Historically, variola major had a case fatality rate of approximately 30% and variola minor, of less than 1%.
- ✓ Smallpox is transmitted person-to-person primarily through close contact (i.e., within 6.5 feet) by respiratory droplets; it may also be transmitted through aerosols and direct contact.

Smallpox and Bioterrorism

- ✓ Smallpox is of high concern for use as a biological weapon because of its potential high morbidity, lack of a treatment (other than supportive), and low immunity status of the current population.

☐ Microbiology and Pathogenesis

- ✓ The causative agent is variola, a double-stranded DNA virus in the genus, *Orthopoxvirus*.
- ✓ The virus enters the body via the oropharynx or respiratory mucosa, spreads systemically, and eventually localizes in small blood vessels of the dermis.

☐ Clinical Presentation

Smallpox "Syndromes"

- ◆ Ordinary type (90% of cases)
- ◆ Modified type (a milder form; occurs in 25% of previously immunized & 2% of non-immunized)
- ◆ Variole sine eruptione (febrile illness in previously vaccinated)
- ◆ Flat type (7% of cases; case fatality 97%)
- ◆ Hemorrhagic type (<3% of cases; case fatality 96-100%)

Ordinary smallpox

- ◆ The incubation period is 12 to 14 days (range, seven to 17 days).
- ◆ Initial prodrome is two to four days in duration: High fever ($>101^{\circ}$ F), prostration, headache, backache, chills, vomiting, and severe abdominal pain.
- ◆ The characteristic exanthem begins on the face, hands, and forearms and spreads to the lower extremities and trunk.
- ◆ Lesions progress in stages of one to two days duration each: macules to papules to vesicles to pustules to scabs.

- ◆ Lesions are in the same stage of development at one time on any one area of the body and are more prevalent on the face, proximal extremities, palms, and soles.
- ◆ Exanthem may be preceded by an enanthem on the oropharyngeal mucosa.
- ◆ Patients are infectious from the onset of rash until all scabs separate (14 to 21 days).

☐ Diagnosis

- ✓ Specimen collection for laboratory diagnosis should be conducted by trained staff using strict infection control precautions.
- ✓ Laboratory diagnosis is conducted by public health laboratories and CDC.
 - ◆ WA State Public Health Lab: Direct fluorescent antibody (DFA) for varicella zoster (VZV) and herpes simplex virus (HSV), VZV serologies, PCR for enterovirus, vaccinia, orthopoxviruses and variola virus
 - ◆ CDC: electron microscopy, variola PCR, orthopoxvirus culture, serology
- ✓ Contact hospital infection control and Public Health – Seattle & King County (PHSKC) immediately for suspected cases of smallpox.

☐ Infection Control

- ✓ Airborne and contact precautions should be followed by all health care providers, staff, and visitors (i.e., gown, gloves, N95 mask).
- ✓ Only vaccinated individuals (within the past three years, or those without contraindications to vaccination) should provide care to suspected smallpox patients.
- ✓ Respiratory and contact isolation is required for all hospitalized patients.
 - ◆ Private, negative pressure room with HEPA-filtered exhaust.

☐ Medical Management

- ✓ Management is supportive; there is no specific treatment.
 - ◆ Monitoring and treating complications:
 - Hemorrhage/DIC.
 - Secondary bacterial infections.
 - Corneal ulceration and/or keratitis.
 - Arthritis or "Osteomyelitis variolosa."
 - Bronchitis, pneumonitis, pneumonia, or pulmonary edema.

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- Encephalitis.
- Other: nausea, vomiting, diarrhea, orchitis.
- ◆ Monitoring and maintaining fluid and electrolyte balance.
- ◆ Skin care: Allow scabs to separate and heal naturally; do not apply salves or ointments.

☐ Prophylaxis

- ✓ **Smallpox vaccine** (Dryvax® Vaccinia Vaccine)
- ✓ Made from live Vaccinia virus (not Variola).
- ✓ Reconstituted in a diluent containing 50% glycerin, and a trace of phenol; also contains polymyxin B, streptomycin, tetracycline, and neomycin.
- ✓ Administered by intradermal inoculation with a bifurcated needle (“scarification”).
- ✓ Vaccination site is monitored for evidence of a “major take,” six to eight days post-vaccination.
- ✓ Protection after primary vaccination exists for three to five years, and probably is present at lower levels for 10 to 15 years post-vaccination.
- ✓ Cross-protection occurs for other Orthopoxviruses.
- ✓ Vaccination within four days of exposure to smallpox will prevent or significantly modify the severity of disease.
- ✓ In the event of known smallpox exposure, the risk of disease outweighs the potential risks from vaccination.
- ✓ Contraindications for vaccination in the absence of current known cases of smallpox include:
 - ◆ a history of atopic dermatitis (or eczema),
 - ◆ active acute, chronic, or exfoliative skin conditions that disrupt the epidermis,
 - ◆ pregnancy,
 - ◆ an immunocompromised state,
 - ◆ known cardiac disease or three or more risk factors for cardiac disease,
 - ◆ close contacts of individuals with any of the above conditions, and
 - ◆ allergy to any vaccine component.

- ✓ Vaccine adverse events
 - ◆ Fever, transient maculopapular rash, and inadvertent autoinoculation are the most common vaccine-related adverse events.
 - ◆ For additional information on vaccine adverse events and their management, please see the CDC smallpox vaccine Web site: <http://www.bt.cdc.gov/agent/smallpox/vaccination/clinicians.asp>.
 - ◆ Vaccinia immune globulin (VIG) and possibly Cidofovir (investigational) may be used to treat some serious adverse reactions to vaccine.
- ✓ New vaccines are under investigation.

☐ Web resources

- ✓ Centers for Disease Control and Prevention Smallpox Response Plan and Guidelines: <http://www.bt.cdc.gov/agent/smallpox/prep/index.asp>
- ✓ Evaluating Patients for Smallpox – Acute, Generalized Vesicular and Pustular Rash Illness Protocol: <http://www.bt.cdc.gov/agent/smallpox/diagnosis/pdf/spox-poster-full.pdf>
- ✓ Smallpox and smallpox vaccine: <http://www.bt.cdc.gov/agent/smallpox/>
- ✓ Infectious Disease Society of America: <http://www.idsociety.org/BT/ToC.htm>
- ✓ Public Health – Seattle & King County: <http://www.metrokc.gov/health>
- ✓ Bioterrorism training modules: <http://nwcphp.org/bttrain>
- ✓ Washington State Department of Health: <http://www.doh.wa.gov>

Report all suspected cases of smallpox immediately to Public Health – Seattle & King County by calling (206) 296- 4774.